

SONS OF GWALIA

- HEADFRAME AND WINDER ENGINE -



GOLD MINING IN WESTERN AUSTRALIA

Until the 1870s the economy of Western Australia was based on wheat, meat and wool. A major change in the state's fortunes occurred in the 1880s when gold was discovered and prospectors by the tens of thousands swarmed across the land in a desperate attempt to discover new goldfields.

Paddy Hannan's discovery at Kalgoorlie and the earlier discoveries at nearby Coolgardie sparked the gold fever. By 1900, more than a third of the state's population was located in the Goldfields.

Gold production reached its first peak in 1903, with over 50 tonnes of gold produced annually. Over the decades production rose and fell. In the mid-1980s a new gold boom hit the state. By 1990, production hit 150 tonnes of gold per year, three times the previous peak of 1903. It reached an all-time record in 2001 with close to 250 tonnes of gold produced that year, being 10% of the world's output.

SONS OF GWALIA MINE

The Sons of Gwalia reef was discovered in 1896. Production and settlement by Europeans immediately commenced and the twin towns of Leonora and Gwalia became established and were connected by railway to Kalgoorlie and Coolgardie, 250 km to the South.

The Sons of Gwalia was in steady production from 1900 until 1910 yielding about 60,000 ounces of gold each year.

By 1919, with its incline shaft just short of 4,000 feet in length, the Sons of Gwalia was the deepest mine in Western Australia, and yet probably the most economical in operation.

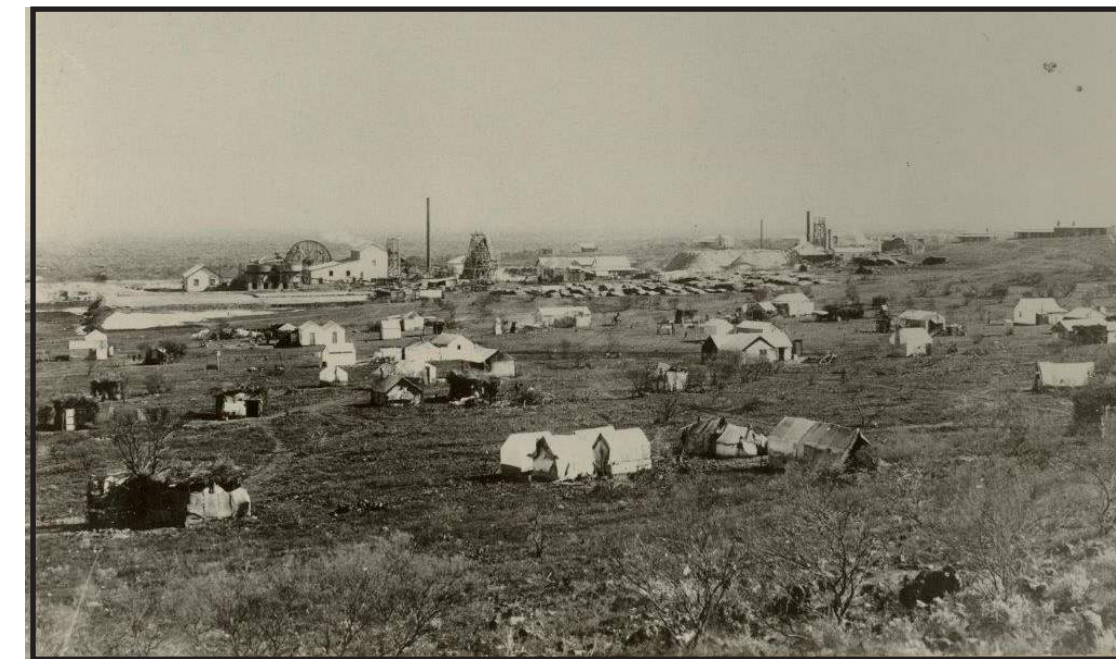
In January 1921, disaster struck when a fire broke out in the gas producer plant. It spread quickly and destroyed the greater part of the surface plant. Dedicated effort by the company staff saved the headframe and winder engine.

Over the next four decades, mine production rose and fell due to various technical problems, the Great Depression, World War 2, labour shortages, the fluctuating price of gold and gradually declining ore grade.

The underground mine remained in production continuously up to 1963, when it became uneconomic and was closed. In the 1980s, the headframe and winder engine were relocated to the Gwalia Museum, while the underground mine has transformed to an open-cut operation.



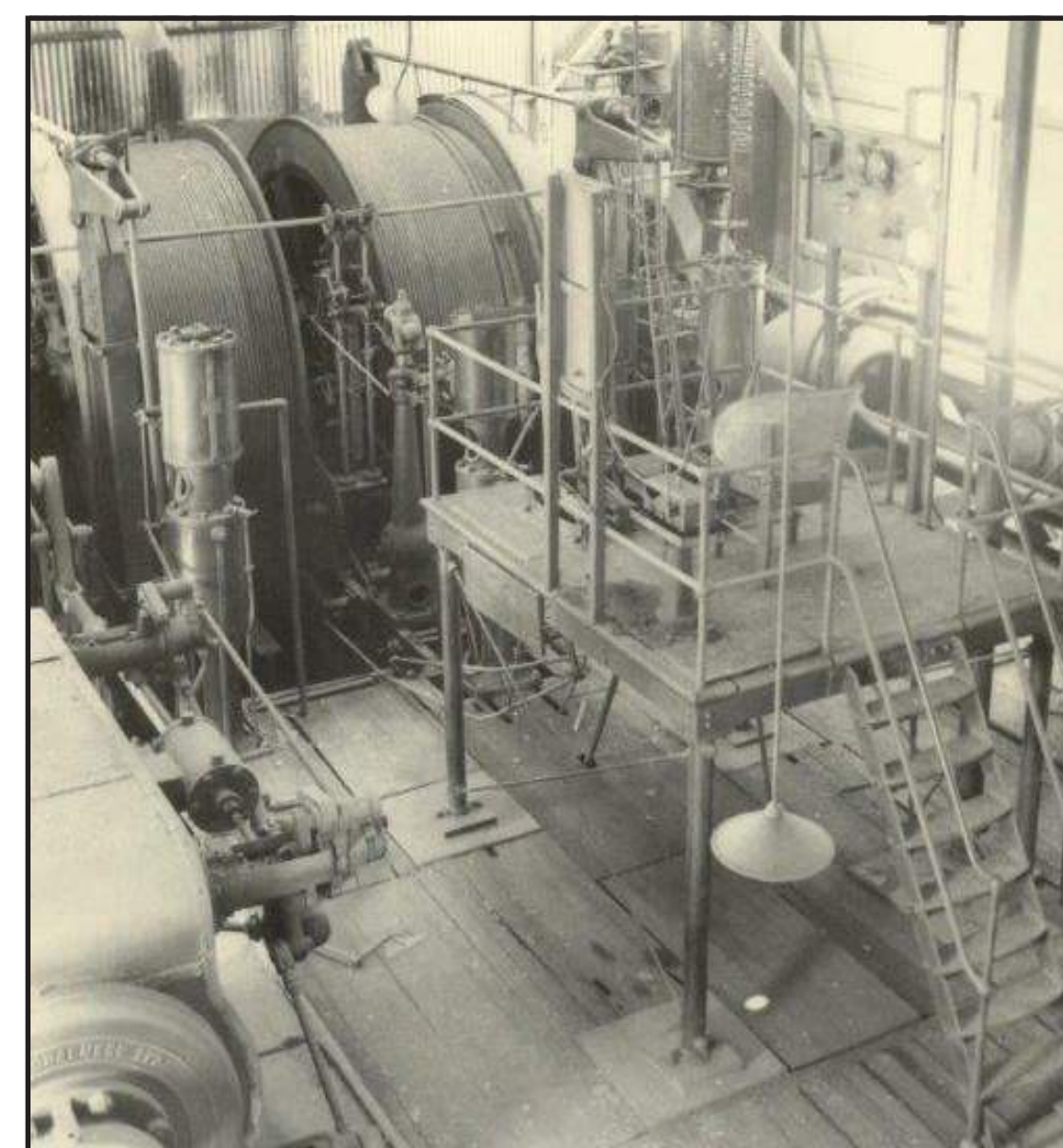
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Gwalia, 1902



Early housing in Gwalia

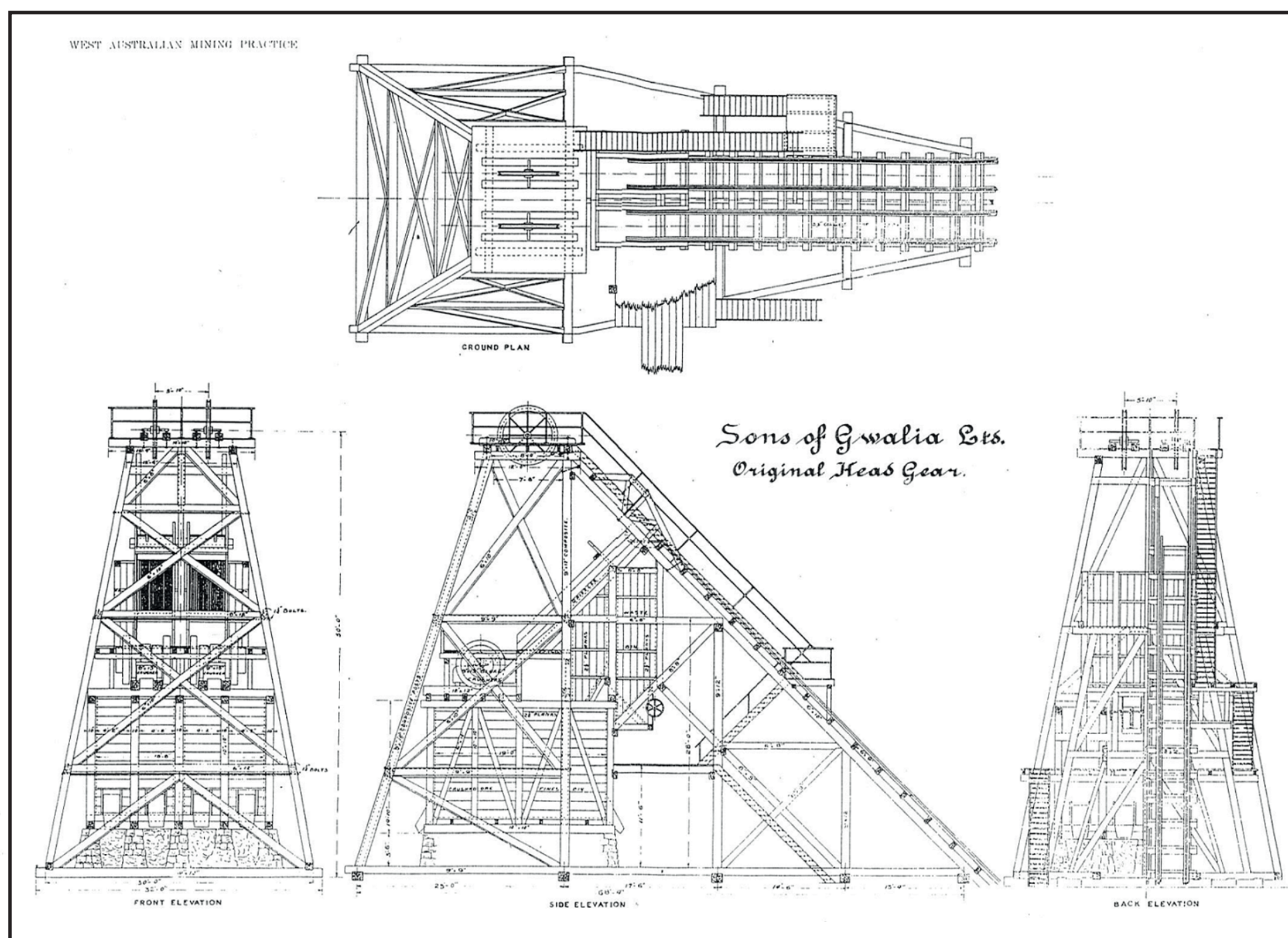


The winder engine remained in use until the mine closed in 1963

BASIC DATA

Headframe height: approx. 20m
Lifting capacity: 13t
Maximum haul length: 5000ft
Headframe timber: Oregon

Winder engine power: 1000hp
Steam pressure: 120psi
Haulage rate: 1500ft per minute
Drum diameter: 10ft



EMINENT PERSONS

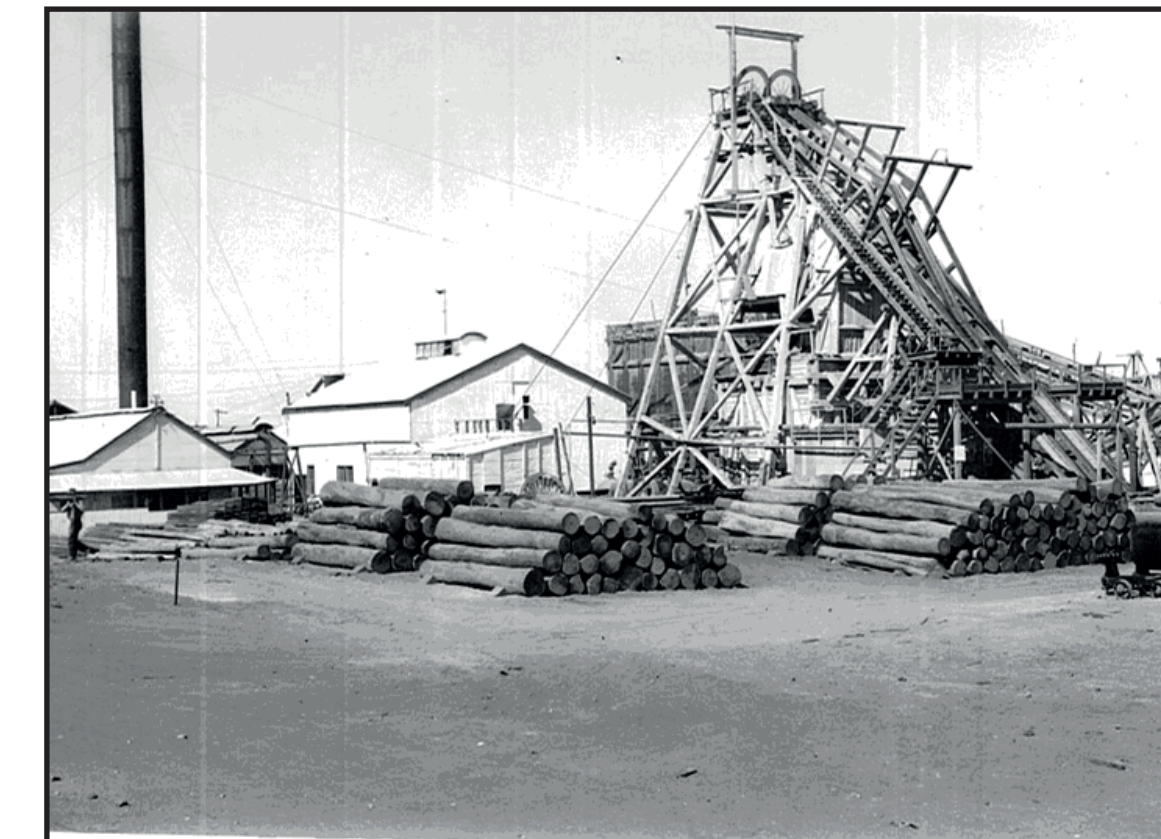


Herbert Hoover was appointed Superintendent of the Sons of Gwalia mine in March 1898 at the age of 24. He instigated efficiencies at the mine, including replacing the vertical shaft with the incline. He developed the mine into a profitable and efficient operation, employing many migrant miners, especially Italian and Austrian. During Hoover's time in Gwalia, the mine employed 500 men.

Herbert Hoover left Gwalia late in November 1898. He became the President of the United States of America in 1929.

An Engineering Heritage National Marker was awarded to Shire of Leonora on 31 May 2015.

Engineers Australia acknowledges the assistance given by Shire of Leonora in producing this interpretation panel. Historical photographs courtesy of Gwalia Museum Group.



Each ore cart dumped its 4t load into a storage bin inside the headframe. The ore was then gravity-fed to the adjacent primary crusher



Mine workers coming off-shift



The steam engine wound the hauling rope onto two 10ft (3m) diameter drums, raising an ore cart every three minutes

THE ROLE OF THE HEADFRAME AND WINDER ENGINE

The timber headframe and winder engine worked together to transport people, timber, horses and ore in and out of the mine workings below. The distinctive 45° incline aligned the mineshaft with the direction of the gold reef, significantly improving the efficiency of the workings.

The headframe guides the hauling ropes between the winder and the ore carts in the shaft and enabled the carts to be elevated so the ore could be discharged at a convenient height above ground.

THE TIMBER HEADFRAME

The original headframe was about 19 metres high with a 45-degree runway on the same incline as the mineshaft. It was slightly increased in height at a later date.

The headframe was constructed using oregon timber imported from the USA. At the time oregon was cost effective and was widely used for building and mine construction in Western Australia. Being relatively light weight (about half the density of locally available jarrah and karri hardwoods) it had the advantage of being easier to transport and erect.

The headframe is the only large timber incline headframe surviving in Australia, and one of very few timber headframes of any size from the nineteenth century. There are only three surviving timber headframes in Western Australia. Sons of Gwalia headframe is the oldest.

The headframe has a landmark quality, demonstrated by its visual impact around the towns of Gwalia and Leonora.

THE WINDER ENGINE

The original 50 horsepower Risdon engine was replaced in 1913 by a two cylinder steam-powered Fraser and Chalmers engine rated at 1000 horsepower and capable of hauling 1500 feet per minute. The manufacturer, from Kent, England, built a wide range of mining machinery from around the turn of a century including many large winders. The company is now incorporated in the General Electric Co.

The winder engine is a direct acting, double-drum steam engine. The cylinders are 27in. diameter with 60in. stroke and diameter of each winding drum is 10ft. The engine is fitted with Corliss valve gear and governor. The post brakes, friction clutches and reversing gear are all operated by steam, and the disc brakes are operated by foot levers. Both drums are loose on shaft, and are operated by friction clutches.

The engine is the largest of its type in Australia and one of only three surviving. It is a fine example of a large, steam-powered winding machine and an example of technological achievement of the period, one hundred years ago.